BIOGRAPHICAL SKETCH

NAME	POSITION TITLE
Erramilli, Shyamsunder	Professor in Physics, Biomedical Engineering and Materials Science & Engineering

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	YEAR(s)	FIELD OF STUDY
Pune University	B. Sc.	1976	Physics & Math
Indian Institute of Technology, Bombay	M. Sc.	1979	Physics
University of Illinois, Urbana	Ph. D.	1986	Physics

Positions and Honors.

1986-1989	Princeton University, Department of Physics	Research Associate
1987-1989	Princeton University, Department of Physics	Instructor
1989-1995	Princeton University, Department of Physics	Assistant Professor
1995-1996	Stanford University, Department of Physics	Visiting Associate Professor
1996-2002	Boston University, Department of Physics & Center for Photonics	Associate Professor
2002-	Boston University, Departments of Physics, Biomedical Engineering & Center for Photonics	Professor
2004-	Director of Graduate Studies in Physics(Boston)	
2007	Imperial College, Chemistry (May-June)	Visiting Professor
2007-2008	University of Cambridge, Department of Applied Mathematics & Theoretical Physics	Visiting Professor

Awards: duPont Young Professor Award (1996)

Service Summary:
- Past Faculty Mentor for the Andrew W. Mellon Foundation Career Enhancement Fellow program.
- Editorial Board, *Journal of Biological Physics*, Springer Verlag.
- Panelist and Reviewer for DOD, NIH and NSF
- International expert proposal reviewer for agencies in Singapore and Canada.
- Undergraduate Research Opportunities Program Committee at Boston.
- Director of Graduate Studies in Physics (2003-2007 and 2009-2010), Boston.
- Faculty facilitator for “Responsible conduct in research” (2004-), Boston.

Publications:

Please note: In 1993, the Immigration and Naturalization Service asked me to alter my name so that my family name, Errramilli, appears second, in order to conform to the custom in the USA. On papers published in 1992 or earlier, the name appears as “E. Shyamsunder”, which is the custom in my native Southern India.

1. Ekin Aslan, Erdem Aslan, Ren Wang, Mi K. Hong, Shyamsunder Erramilli, Mustafa Turkmen, Omer G. Saracoglu, and Luca Dal Negro "Multispectral Cesaro-Type Fractal Plasmonic Nanoantennas" *ACS Photonics* 3, 2102-2111 (2016).

2. F. Mateen, C. Maedler, S. Erramilli and P. Mohanty "Wireless actuation of micromechanical resonators" (Nature) *Microsystems & Nanoengineering* 2, 16036 (2016). doi:10.1038/micronano.2016.36

3. J. Shattuck, P. Shah, S. Erramilli and L.D. Ziegler "Structure Making and Breaking Effects of Cations in Aqueous Solution: Nitrous Oxide Pump-Probe Measurements" *The Journal of Physical Chemistry B* 120, 10569-10580 (2016).

4. F. Mateen, B. Brown, S. Erramilli and P. Mohanty "Wireless actuation of bulk acoustic modes in micromechanical resonators" *Applied Physics Letters* 109, 073502 (2016).

5. A. Mandal, S. Erramilli and L. D. Ziegler "Origin of Dispersive Line Shapes in Plasmonically Enhanced Femtosecond Stimulated Raman Spectra" *The Journal of Physical Chemistry C* 120, 20998-21006 (2016).

6. Carsten Mädler, Daniel Kim, Remco Spanjaard, Mi Hong, Shyamsunder Erramilli, and Pritiraj Mohanty, "Sensing of the Melanoma Biomarker TROY Using Silicon Nanowire Field-Effect Transistors" *ACS Sensor* 1, 696-701 (2016) doi 10.1021/acsensors.6b00017.

7. A. Totachawattana, H. Liu, A. Mertiri, M. K. Hong, S. Erramilli, and M. Y. Sander, "Vibrational mid-infrared photothermal spectroscopy using a fiber laser probe: asymptotic limit in signal-to- baseline contrast," *Opt. Lett*. **41**, 179-182 (2016).

8. T. Stark. M. Imboden, S. Kaya, A. Mertiri, J. Chang, S. Erramilli, D. J. Bishop "A MEMS Tunable Mid-Infrared Plasmonic Spectrometer" *ACS Photonics*, **3**, 14-19 (2015).

9. P. Diep, S. Pannem, J. Sweer, J. Lo, M. Snyder, G. Stueber, Y. Zhao, S. Tabassum, R. Istfan, J. Wu. S. Erramilli and D. Roblyer "Three-dimensional printed optical phantoms with customized absorption and scattering properties" *Biomedical Optics Express* **6**, 4212-4220 (2015).

10. A. E. Cetin, S. Kaya, A. Mertiri, E. Aslan, S. Erramilli, H. Altug, Mustafa Turkmen "Dual-band plasmonic resonator based on Jerusalem cross-shaped nanoapertures" *Photonics and Nanostructures – Fundamentals and Applications* **15**: 73-80 (2015).

11. C. Maedler, G. Keiser, A. Yi, J. Christopher, M. K. Hong, A. Mertiri, L. House, H. R. Seren, X. Zhang, R. Averitt, P. Mohanty, S. Erramilli "II. Wireless transfer of power by a 35-GHz metamaterial split-ring resonator rectenna array" [submitted]

12. A. Mertiri, H. Altug, M. K. Hong, P. Mehta, J. Mertz, L.D. Ziegler and S. Erramilli "Pitchfork Bifurcation and Zharov splitting in Nonlinear Mid-infrared Photothermal Spectroscopy" (2014) *ACS Photonics* **1**, 696-702. [arXiv:1310.0123]

13. J. T. Shattuck, J. R Schneck, L. R. Chieffo, S. Erramilli, L. D. Ziegler "Dispersed Three-Pulse Infrared Photon Echoes of Nitrous Oxide in Water and Octanol" (2013) *Journal of Physical Chemistry B*, 117: 15774-15785. doi: 10.1021/jp4065533.

14. C. Maedler, D. Kim, R. A. Spanjaard, M. Hong, S. Errramilli, P. Mohanty "Detection of melanoma biomarker TROY using silicon nanowire field-effect transistors" arXiv: 1312.7532 (2013, *submitted*)

15. A. E. Cetin, A. Mertiri, M. Huang, S. Erramilli and H. Altug "Thermal Tuning of Surface Plasmon Polaritons using Liquid Crystals" (2013) *Advanced Optical Materials* **1**, 915-920.

16. R. Adato, A. Artar, S. Erramilli and H. Altug “Engineering Absorption Enhancement and Induced Transparency in Coupled Molecular and Plasmonic Resonator Systems” (2013) *Nanoletters* **13**, 2584-2591.

17. Carsten Mädler, Shyamsunder Erramilli, L. J. House, M. K. Hong, and Pritiraj Mohanty, "Tunable nanowire “Wheatstone bridge for improved sensitivity in molecular recognition" *Applied Physics Letters* **102**, 043112 (2013).

18. J. R. Schneck, E. Dimakis, J. Woodward, S. Erramilli, T. D. Moustakas, and L. D. Ziegler "Temperature dependent photon echoes of a GaN thin film" *Applied Physics Letters*, **101**, 142102 (2012).

19. Arif E. Çetin, Ahmet A. Yanik, Alket Mërtiri, Shyamsunder Erramilli,Özgür E. Müstecaploglu, and Hatice Altug "Field-effect active plasmonics for ultracompact electro-optic switching" *Applied Physics Letters*, **101**, 12113 (2012).

20. A. Mertiri, T. Jeys, V. Liberman, M. K. Hong, J. Mertz, H. Altug and S. Erramilli “Mid-infrared photothermal heterodyne spectroscopy in a liquid crystal using a quantum cascade laser”. (2012) *Applied Physics Letters*, **101**, 044101.

21. E. R. Pinnick, S. Erramilli and F. Wang “Predicting the melting temperature of ice-Ih with only electronic structure information as input”. (2012) *J. Chem. Phys*. **137**, 014510.

22. V. Liberman, R. Adato, T. H. Jeys, B. G. Saar, S. Erramilli and Hatice Altug “Rational design and optimization of plasmonic nanoarrays for surface enhanced infrared spectroscopy”. (2012) *Optics Express* **20**, 11953-11966.

23. M. K. Hong and S. Erramilli “A dynamic role for water in biological systems” (2012) *Journal of Biological Physics* **38**, 1-2. doi: 10.1007/s10867-011-9256-2

24. V. Lieberman, R. Adato, A. Mertiri, A. A. Yanik, K. Chen, T. H. Jeys, S. Erramilli and H. Altug “Angle- and polarization- dependent collective excitation of plasmonic nanoarrays for surface enhanced infrared spectroscopy” (2011) *Optics Express* **19**, 11202-11212.

25. Y. Chen, X, Wang, M. K. Hong, C. L. Rosenberg, B. M. Reinhard, S. Erramilli and P. Mohanty (2010) “Nanowire detection of Breast Cancer Biomarker” *Applied Physics Letters* **97**, 233702-233705.

26. E. R. Pinnick, S. Erramilli, F. Wang (2010) “Computational investigation of lipid hydration water of L-alpha 1-palmitoyl-2-oleoyl-sn-glycero-3-phosphocholine at three hydration levels” *Molecular Physics* **108**, 2027-2036.

27. E. R. Pinnick, S. Erramilli, F. Wang (2010) “The potential of mean force of nitrous oxide in a 1,2-dimyristoylphosphatidylcholine lipid bilayer” *Chemical Physics Letters* **489**, 96-98.

28. R. Adato, A. A. Yanik, J. L. Amsden, D. L. Kaplan, F. Omenetto, M. K Hong, S. Erramilli and H. Altug (2009) “Ultrasensitive vibrational spectroscopy of protein monolayers with plasmonic nanoantenna arrays” *Proc. Natl. Acad. Sci* **106**, 19227-19233.

29. A. Yanik. R. Adato, S. Erramilli, H. Altug (2009) “Hybridized nanocavities as single-polarized nanoantennas” *Optics Express*, **17**, 20900-20910 .

30. J. P. Celli, B. S. Turner, N. H. Afdhal, S. Keates, I. Ghiran, C. P Kelly, R. H. Ewoldt, G. H. McKinley, P. T. C. So, S. Erramilli, R. Bansil (2009) "Helicobacter pylori moves through mucus by reducing mucin viscoelasticity" *Proc. Natl. Acad. Sci* **106**, 14321-14326.

31. J. Stefan-Wenzler, T. Dunn, S. Erramilli, P. Mohanty (2009) "Nanoelectromechanical system-integrated detector with silicon nanomechanical resonator and silicon nanochannel field effect transistor" *J. Appl. Physics* **105**, 094308.

32. S. Erramilli (2009) "Solitons, From Below", Journal of Biological Physics **35**, 5-7.

33. X.Wang, Y. Chen, K. A. Gibney, S. Erramilli, P. Mohanty (2008) "Silicon-based nanochannel glucose sensor", *Appl. Phys. Lett.* **92**, 013903-013905.

34. Y. Chen, X. Wang, M. K. Hong, P. Mohanty (2008) "Nanoscale enzyme Sensor for urea sensing", *Sensors and Actuators B* **133**, 593-598

35. L. R. Chieffo, J. T. Shattuck, E. Pinnick, J. J. Amsden, M. K. Hong, F. Wang, S. Erramilli, L. Ziegler (2008) "Nitrous Oxide Vibrational Energy Relaxation Is a Probe of Interfacial Water in Lipid Bilayers", J. Phys. Chem B**, 112**, 12776-12782.

36. A. Yanik. X. Wang, M. K. Hong, S. Erramilli, H. Altug(2008) "Extraordinary mid-infrared transmission through coaxial aperture arrays: localized plasmons and surface plasmons" *Applied Physics Letters*, **93**, 81104.

37. Amsden, J. J., Kralj, J. M., Chieffo, L. R., Wang, X. H., Erramilli, S., Spudich, E. N., Spudich, J. L., Ziegler, L. D., & Rothschild, K. J. (2007) "Sub-picosecond Protein Backbone Changes during the Green-Absorbing Proteorhodopsin Primary Photoreaction" *Journal of Physical Chemistry B* **111,** 11824-11831.

38. Yu Chen, Xihua Wang, Mi K. Hong, Shyamsunder Erramilli, Pritiraj Mohanty, and Carol Rosenberg, (2007) "Nanoscale field effect transistor for biomolecular signal amplification" *Appl. Phys. Lett.* 91, 243511.

39. L. Chieffo, J. Amsden, J. Shattuck, S. Erramilli and L. Ziegler (2007) "Ultrafast vibrational relaxation of liquid H2O following librational combination excitation" *Chemical Physics* **341**, 71-80.

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41. L. Chieffo, J. Amsden, J. Shattuck, M. K. Hong. L. Ziegler and S. Erramilli "Femtosecond infrared vibrational lifetime measurements of the anesthetic gas nitrous oxide in membranes." *Biophysical Reviews and Letters*, Vol. 1, 309-316 (2006). Web archive at arXiv:0705.0835v1 [physics.bio-ph]

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43. L. Chieffo, J. Amsden, J. Shattuck, M. K. Hong. L. Ziegler and S. Erramilli (2006) *Femtosecond infrared vibrational lifetime measurements of the anesthetic gas nitrous oxide in membranes.* Biophysical Reviews and Letters, 1, 309-316.

44. Y. Chen, X. Wang, S. Erramilli, and P. Mohanty (2006). *Silicon-based nanoelectronic field-effect pH sensor with local gate control.* Applied Physics Letters 89, 223512.

45. J. Celli, B. Gregor, B. Turner, N. H. Afdhal, R.Bansil, and S. Erramilli (2005) *Viscoelastic Properties and Dynamics of Porcine Gastric Mucin* Biomacromolecules **6**, 1329 – 1333.

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55. S. Erramilli, F. Osterberg, S. M. Gruner, M. W. Tate and M. Kriechbaum ``Time-Resolved X-ray diffraction studies of Pressure-jump induced topological transitions in biological membranes" *Proc. SPIE* **2521**: 188-196 (1995).

56. Shyamsunder Erramilli, F. Osterberg and B. Vogelaar ``Undergraduate laboratory: Principles of Gel Electrophoresis" *American Journal of Physics* **63**:, 639-643 (1995).

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64. J. T. Gleeson, S. M. Gruner and Shyamsunder Erramilli ``Freezing and melting of water in membranes", *Biophysical Journal* **67**: 706-712 (1994).

65. C. H. Ahn, M. G. Allen, W. S. N. Trimmer, Y. Jun and Shyamsunder Erramilli ``A Fully Integrated Micromachined Magnetic Particle Manipulator and Separator" *IEEE Journal of Microelectromechanical Systems*

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Research projects:

1. Ultrafast infrared spectroscopy as a probe for the mechanism of anesthetic action (in collaboration with L. Ziegler, F. Wang).

2. Ultrafast infrared spectroscopy for photosensitive proteins (in collaboration with K. Rothschild. L. Ziegler).
3. Infrared Metamaterials for proteomics (in collaboration with H. Altug).
4. Development of nanosensors for cancer biomarkers (in collaboration with P. Mohanty).
5. Photothermal Microscopy (with J. Mertz)
6. Optogenetics, ultrafast infrared spectroscopy (with K. J. Rothschild).
7. Nanoplasmonic antenna for power conversion (in collaboration with R. Averitt).

Patent/Disclosures:

1. H. Altug, R. Adato, S. Aksu, A.A. Yanik, S. Erramilli, "Nanoantenna Arrays for Nanospectroscopy, Methods of Use and Methods of High-Throughput Nanofabrication". Boston University Ref No.: BU09-59 and BU 10-014. NP Ref No.: 701586-068771-PCT. Submitted for Patent Cooperation Treaty (PCT) application.
2. Y. Chen. X. Wang, A. Kalinowski, M. Hong, P. Mohanty, S. Erramilli "Nanochannel-based sensor system for use in detecting chemical or biological species" Application Number: 20100039126. Priority date: Nov 17, 2006. Also published as US20140030747, W02008063901A1.
3. J.-S. Wenzler, T. Dunn, S. Erramilli, P. Mohanty "Integrated MEMS and IC systems and Related Methods" Application number: 201000155883.
4. P. Mohanty, S. Erramilli, X. Wang, Y. Chen "Glucose sensor employing semiconductor nanoelectronic device". Application number: 20110021894.